National Institute of Environmental Health Sciences

On the causal link between carbon dioxide and air pollution mortality

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Abstract:

Greenhouse gases and particle soot have been linked to enhanced sea-level, snowmelt, disease, heat stress, severe weather, and ocean acidification, but the effect of carbon dioxide (CO2) on air pollution mortality has not been examined or quantified. Here, it is shown that increased water vapor and temperatures from higher CO2 separately increase ozone more with higher ozone; thus, global warming may exacerbate ozone the most in already-polluted areas. A high-resolution global-regional model then found that CO2 may increase U.S. annual air pollution deaths by about 1000 (350-1800) and cancers by 20-30 per 1 K rise in CO2-induced temperature. About 40% of the additional deaths may be due to ozone and the rest, to particles, which increase due to CO2-enhanced stability, humidity, and biogenic particle mass. An extrapolation by population could render 21,600 (7400-39,000) excess CO2-caused annual pollution deaths worldwide, more than those from CO2-enhanced storminess. Copyright 2008 by the American Geophysical Union.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

Other Climate Scenario: author defined scenario

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Unspecified Exposure

Air Pollution: Ozone

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

United States

Health Co-Benefit/Co–Harm (Adaption/Mitigation): ☑

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cancer, Morbidity/Mortality, Respiratory Effect

Respiratory Effect: Asthma

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Mitigation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Historical